

## CLAIMS

What is claimed is:

- 1           1.       A DSL modem for coupling a transmission line to a communication  
2       system interface, the modem comprising:  
3               a switching converter having an input for receiving an input power signal from  
4               the communication system interface, the switching converter for  
5               generating a switching signal having a switching period associated with  
6               an active portion and a non-active portion; and  
7               a magnetic link having a power input for receiving the input power signal, and  
8               a data input for receiving a data signal, the magnetic link operatively  
9               coupled to the switching signal of the switching converter, the magnetic  
10              link for transferring the input power signal during the active portion of  
11              the switching period, and for transferring the data signal during the  
12              non-active portion of the switching period.
- 1           2.       The modem of claim 1, wherein the magnetic link has a number of power  
2       outputs, each power output electrically isolated from the power input by virtue of the  
3       magnetic link, and for providing a transferred power signal to a corresponding load.
- 1           3.       The modem of claim 1, wherein the magnetic link has a data output that is  
2       electrically isolated from the data input by virtue of the magnetic link, the data output for  
3       providing a transferred data signal to a component included in the modem.
- 1           4.       The modem of claim 1, wherein the data signal at the data input of the  
2       magnetic link is one of received from a system-side of the modem and transferred to a  
3       line-side of the modem, or received from the line-side of the modem and transferred to  
4       the system-side of the modem.

1           5.     The modem of claim 1, wherein the data signal is a multiplexed,  
2     modulated digital signal.

1           6.     The modem of claim 5, wherein the data signal is modulated using a clock  
2     signal as a data carrier, and the clock signal is provided by one of a digital signal  
3     processor included in the modem, a clock recovery module included in the modem, or a  
4     signal source included in the communication system interface.

1           7.     The modem of claim 5, wherein the data signal is multiplexed using a  
2     multiplexer included in the modem, and the multiplexer is configured to transmit the  
3     multiplexed, modulated digital signal to the data input of the magnetic link substantially  
4     during the non-active portion of the switching period.

1           8.     A method for communicating power signals and data signals between a  
2     first-side of a modem and a second-side of the modem, the method comprising:

3                 electrically isolating the first-side of the modem from the second-side of the  
4                 modem using a magnetic link;

5                 generating a switching signal having a switching period associated with an  
6                 active portion and a non-active portion;

7                 transferring an input power signal across the magnetic link during the active  
8                 portion of the switching period; and

9                 transferring an input data signal across the magnetic link during the non-active  
10                portion of the switching period.

1           9.     The method of claim 8, wherein the magnetic link has a power output that  
2     is electrically isolated from the input power signal by virtue of the magnetic link, and  
3     wherein the step of transferring the input power signal across the magnetic link further  
4     comprises:

5                 converting the input power signal to an output power signal; and

6 delivering the output power signal from the power output to a corresponding  
7 load.

1 10. The method of claim 8, further comprising:

2 receiving the input power signal from a communication system interface that is  
3 operatively coupled to one of the first-side or the second-side of the  
4 modem; and

5 receiving the input data signal from one of the first-side or the second-side of  
6 the modem.

1 11. The method of claim 8, wherein the magnetic link has a data output that is  
2 electrically isolated from the input data signal by virtue of the magnetic link, and wherein  
3 the step of transferring the input data signal across the magnetic link further comprises:

4 converting the input data signal to an output data signal; and

5 delivering the output data signal from the data output to one of the first-side or  
6 the second-side of the modem.

1 12. The method of claim 11, further comprising:

2 de-multiplexing the delivered output data signal; and

3 demodulating the de-multiplexed, delivered output data signal thereby yielding  
4 a digital communication signal.

1 13. The method of claim 11, further comprising:

2 recovering a clock signal that was used as a data carrier from the delivered  
3 output data signal; and

4 providing the recovered clock signal to facilitate demodulation of the delivered  
5 output data signal.

1 14. The method of claim 8, wherein the first-side of the modem is a system-  
2 side that is operatively coupled to a communication system interface, and the second-side  
3 of the modem is a line-side that is operatively coupled to a transmission line.

1           15.     The method modem of claim 8, further comprising:  
2                 modulating digital communication data to a frequency range that is  
3                 substantially within a bandwidth associated with the magnetic link.

1           16.     The method of claim 15, wherein the step of modulating digital  
2     communication data includes:  
3                 receiving a clock signal from one of a digital signal processor included in the  
4                 modem, a clock recovery module included in the modem, or a signal  
5                 source included in a communication system interface that is operatively  
6                 coupled to one of the first-side or the second-side of the modem; and  
7                 using the clock signal as a data carrier.

1           17.     The method modem of claim 8, further comprising:  
2                 modulating digital communication data to a frequency range that is  
3                 substantially within a bandwidth associated with the magnetic link; and  
4                 multiplexing the modulated, digital communication data thereby yielding the  
5                 input data signal.

1           18.     The method of claim 17, wherein the step of multiplexing the modulated,  
2     digital communication data further comprises:  
3                 transmitting the multiplexed, modulated digital communication data to the data  
4                 input of the magnetic link substantially during the non-active portion of  
5                 the switching period.